Vol. 10 No. 2 October, 2004 ISSN - 0972-2548

FITT FORUM

A Newsletter of Foundation For Innovation and Technology Transfer, **Indian Institute of Technology, Delhi**

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NGC-FITT Tie-up Hunt for Innovator of the Year

National Geographic Channel and Foundation for Innovation and Technology Transfer (FITT), Indian Institute of Technology- Delhi, entered into a path-breaking alliance to promote innovation in India. The campaign involves a national hunt for 'the Innovator of the Year' and 'the Young Innovator of the Year' and primarily focuses on recognising Indians who have turned their creative genius into beneficial technology within India. The Innovator of the year would be awarded Rs.10 lakhs and the young innovator Rs.2 lakhs. For further information, please visit the website: www.fitt-iitd.org or www.iitd.ac.in

Revised IIT Delhi 'Technology Compendium' & HRD Booklet

FITT has brought out the new revised edition of the Compendium of technologies being developed by various Centres/Departments of IIT Delhi with the incorporation of profiles on many of the patented technologies. For further information, you may visit the websites: http:// www.fitt-iitd.org or http://www.iitd.ac.in

FITT has also brought out a compiled HRD booklet about short courses and training programmes for the period 1994- 2003 organised under the aegis of FITT.

Convocation Ceremony: Standing (from L to R) Prof. M.G.K. Menon, Chairman, B.O.G., IITD; Prof. C.N.R. Rao; Shri Rajat Gupta, Senior Partner McKinsey; Mr. G. Madhavan Nair, Chairman ISRO; Prof. R.S. Sirohi, Director, IIT Delhi

Convocation at IITD 2004

The 35th Convocation of IIT Delhi was held on August 14, 2004 at the Seminar Hall of IITD. The chief guest of the function was **Mr. Rajat Gupta**, Senior Partner McKinsey. **Prof. M.G.K. Menon**, Chairman, B.O.G., IITD conferred the Degree of Doctor of Science (Honoraria Causa) to two distinguished Scientists, **Prof. C.N.R. Rao** & **Mr. G. Madhavan Nair**, Chairman ISRO. **Mr. Akhil Gupta**,CEO, Corporate Development, Reliance Infocomm Ltd., Mumbai, **Ms. Padmasree Warrior**, Senior Vice President and Chief Technology Officer, Motorola Inc., USA & **Dr. Madhu Sudan,** Professor, Deptt. of EE & CS, MIT, USA were given distinguished alumni awards. President Gold's medal was given to **Mr. Varun Gupta** in absentia.

Mr. Rajat Gupta, the chief guest in his convocation address remarked," The Americans got it right when they called today's event not a 'graduation' but a 'commencement'. I believe that those of you who make today the moment you graduate from learning will miss an opportunity and miss a beat in understanding what is happening in the global economy. Whilst, those who make today the commencement of a lifelong and professional quest to know more, each day will live fruitful and successful lives".

Earlier, while delivering the Director's Report, the Director of IITD **Prof. R. S. Sirohi** presented a brief report highlighting the Institute's activities, achievement and future plans.

...Contd. on page 14

FROM THE DESK OF THE MANAGING DIRECTOR

A Message from the Managing Director

The FITT FORUM was first published in 1994. Ten years have passed and the newsletter has been providing the readers information on achievements, national and international events and anecdotes concerning the faculty, departments and centers of the Institute, as well as activities of the Foundation For Innovation & Technology Transfer (FITT) aimed at furthering Industry-Academic interactions.

About three years ago, we took a major initiative to launch the Technology Business Incubation Unit (TBIU) programme at IIT Delhi; a first of its kind in this country for motivating, and then supporting, scientists and graduate students to become entrepreneurs, by setting up Technology Start-ups based on R&D spin-offs in the Institute-in the model of such successful enterprises like Hewlett-Packard, CISCO, Sun-Microsystems who started in the incubators of US Universities. The TBIU Programme has caught on in IIT Delhi; at the moment there are five Incubatee Resident Start-ups in the Institute, four of which were promoted by graduating students and their erstwhile faculty supervisors, and one by a Senior faculty member himself along with one of his earlier students. Information on these Companies, and how the national media sees them, have been included in all recent issues of FITT FORUM. I foresee a great future for these Start-ups, and wish them all success.

Dr. A. K. Sengupta

IIT's Incubation Program

The incubation programme, pioneered by IIT-Delhi, has seen seven startup companies incorporated by the faculty and alumnus of the institute. IIT-Delhi's incubation programme, called Foundation for Innovation and Technology Transfer (FITT), provides seed money and infrastructure support to startups for a year. FITT Managing Director **Dr. A. K. Sengupta** said: "We help faculty with technology transfer agreements, advise on patents, and even help launch startup companies". Some of the startup companies at IIT-Delhi include INRM Consultants, which is using Geographic Information System (GIS) technology for natural resources planning and management; VirtualWire Technologies, a wireless and communications firm; KritiKal Solutions, which is into embedded systems, computer vision and networking technologies; Sof-Blue India, involved in developing Bluetooth enabled energy meters. Sof-Blue India and INRM Consultants have exited and are on their own now.

Dr. Sengupta told eFE: "Universities and technical institutions are the most significant entities in the incubator concept. They have the resources and potentialities to provide (at the minimum cost) technologies, knowledge and innovations for the incubator tenants through an effective and efficient delivery system".

(Extracted from the Financial Express, September 13, 2004).

Elfsys Embedded Solutions Pvt. Ltd.

A new TBIU Resident has come up at IIT Delhi. The company Elfsys Embedded Solutions Pvt. Ltd., has been established with two faculties and five graduating students of the Department of Electrical Engineering, IIT Delhi.

The focus of the company will be on developing solutions to technological problems, which have a ready market demand. It will mainly target systems and technologies for security and defence applications.

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Genie Networks

A new TBIU unit has been set up at IIT Delhi. The company named Genie Networks has been co-promoted by two faculty members and four graduating students of the Department of Computer Science and Engineering , IIT Delhi.

The main objective of the company is for embarking on incubation exercise in the area of WiFi, WiMax, Wireless Mesh Networks and 3G Systems.

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Sofblue India (P) Ltd.

Since March 2004 Sofblue has covered following milestones to ultimately reach the destination of manufacturing energy meters with wireless meter reading capability:

1. *10 Year Data Backup without battery*
Micro-controller based Single phase energy meter has been developed with data retention capability of more than 10 years without battery backup. The meter is low-cost design with its display based on 7-digit LCD.

2. *Energy Theft Measurement and Control system for Power Utilities*
100 years calendar incorporated in meter to identify the date and time of meter tampering or theft of power. The theft is of various types out of them major three situations are kept under consideration while designing i.e., Earth Load, Phase-Neutral Reversal and Neutral Missing Protection.

3. *AMR with Cost Effective Virtual-Wire Technology*
Cost-effective virtual-wire technology based data downloading utility namely Automatic Meter Reading (AMR) system has been developed. It has successfully downloaded the data with in range of 100m and its range can be increased up to 300m.

For more information, please contact:
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KritiKal Solutions Pvt. Ltd.

The Company has done well and posted profit . The significant increase in the performance can be attributed to the various projects undertaken by the Company and timely deliverance thereof.

At present the company has five live projects in hand. Besides this, the company own partial rights to some products and there are guaranteed royalties from others. The company has also invested significantly into inhouse product development: market research for product identification and market validation, core technology development, engagement with potential business partners (MOUs) & funding agencies etc.

The company has grown to 18 people (fulltime). Besides increasing technical capacity, it has also built a professional business core looking after business development and sales & marketing, and added support staff and infrastructure.

The business plan for the future is two pronged: The company plans to scale up its project business (by establishing a *Project Business Unit*) and launch products using core technology generated in this unit through a *Product Business Unit*. It has been planned to launch products in two areas in the next 2-3 years : a Camera based Compound Surveillance System and a Camera based Traffic Management System. The Company is in negotiations with Venture Capitalists and business partners for executing this plan.

For more information, please contact:
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Sanmotech

A new incubator unit Sanmotech has entered the TBIU of IIT Delhi. SANMOTECH stands for Synthetic and Natural Molecular Technologies which signifies the start of innovative technology development initiative in niche chemical areas.

The initial stress of the company would be to develop highly effective sun screen activities for dermal and other applications but eventually Sanmotech would strive to cover other areas like organic coatings, molecular diagnostics, adhesive sealants for cell phones and other microelectronic devices, polymer additives, sensor materials and molecular filters etc. These applications are based upon utilization of the concepts of supra molecular chemistry and meta cyclophanes (MMCs) being investigated in the labs of IIT Delhi for the past several years. The methodology for developing sunscreens would employ unique UV absorption parameters of some MMC derivatives in seeking synergistic protection from harmful UV-A and UV-B components of solar radiation as against currently used UV-B protectants. The company would develop new broad spectrum dermal sunscreen ingredients and formulations using GRAS incipient and materials for spectacle coatings. Sanmotech desires to be a technology development company which envisages commercial success initially through technology transfer mechanism and later by entering into manufacturing, distribution and marketing strategies with collaborators who are already active into these areas.

For carrying out R&D work to fine tune laboratory data for commercial applicability, Sanmotech plans to use existing IITD infrastructure, faculty, students and labs as per terms and conditions of the TBIU scheme. The developed commercial utility data would be transferred to interested commercial companies. ***(See also page 20)***

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VirtualWire Technologies

VirtualWire Technologies is a wireless and communications technology company. It was set up by a team of two faculty members and three alumni from the Department of Electrical Engineering at IIT Delhi. The company is being incubated at the Technology Business Incubation Unit, IIT Delhi. The work culture of the company works around research and innovation.

Areas of Expertise:
The company has gained experiences in the following areas:
i) Signal Processing
This is the core expertise area and the team is backed by years of experience in this field.

ii) Algorithm Design
A large number of algorithms have been designed by the company targeting specific problems in the communication field. Many of these algorithms have been published in various journals and/or patented. Some of the problems being addressed currently are multi-user detec-

tion in a saturated CDMA environment, blind-estimation of channels, low-bit rate speech coding, blind detection and synchronization in OFDM systems, etc.

iii) Application of Coding Theory
Work is being done for using coding theory for improvement of communication systems, e.g. development of space-time codes for MIMO systems, use of wavelet transforms for error-control coding, etc.

iv) Wireless Standards
Development of a clear understanding and implementation of various wireless standards, particularly IEEE 802.x, 3G-CDMA, W-OFDM etc. is being gradually targeted.

v) Security
The company has expertise in Cryptosystem design, providing FPGA based security solutions and also gained experience in development of solutions for wireless data security.

vi) Hardware Implementations
The company implements complete communication systems in FPGA, ASIC etc, even taking care of antenna designs and other requirements. They also have access to facilities and equipment to fabricate and test out different antenna designs.

For more information, please contact:
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IIT incubator for start-ups is making them dream big at home

(Over 50 applications received in three years for an opportunity that is funded by internal resources, loan that's written off if you fail)

IIT Delhi students are queuing up for start-up support to launch their own companies. As a result, the Technology Business Incubation Unit (TBIU) at the institute is reporting a mad rush.

''The students have some great ideas which have excellent business potential and we need to provide them with a nurturing ground. These graduates are hot commodities once they leave, both in the industry and in academics, but we want to help them here.'' says **Dr. A. K. Sengupta**, MD, Foundation for Innovation and Technology Transfer (FITT).

The unit was set up in 2000 and at present there are three resident companies with four more in the pipeline. The number of applications received by the unit over the past three years has crossed 50.

The programme is sustained totally by the internal resources of IIT Delhi and FITT. If the company manages to stay afloat, it repays a small loan back to the institute; if it doesn't, the loan is written off. The incubation period for a company is two years. ''Here we promote R&D, but smaller research and bigger development.'' added Sengupta.

The TBIU takes the research activity from the laboratory to the marketplace and provides infrastructure and assistance to facilitate research and development. The start-ups are given to faculty, students, alumni and scientists.

Incubation programmes in the West have had success stories like Google and Hewlett Packard. The concept was first brought to the country in an institutionalised fashion by IIT Delhi four years ago.

''IIT students had the option of either joining a software company or working at a low-end technological job and that is why students want to go abroad. But with a start-up opportunity, more and more students feel that their work at IIT can lead to something bigger.'' says **Vishal Chandra**, chief executive officer of VirtualWire Technology, a TBIU project.

Virtual is a year-old company headed by Chandra, an electrical engineer of the 2003 batch. He submitted his proposal along with other classmates in his final year. He has also given his GRE, but once the proposal went through, Chandra opted to stay back.

Chandra's company has bagged the contract to make a scrambler for Bharat Electronics, which will encrypt speech and provide security in wireless communication. The other company in the incubation phase is Kritikal Solutions. Kritikal is two-year-old and is the first student-faculty-led enterprise, headed by Dipender Sekhon, an IIT Delhi graduate of the 2002 batch.

The institute has also seen an increase in the number of patent applications with 100 applications received between 1998-2004. In 1993-96 only 14 applications were received.

(Source: The Indian Express, August 4, 2004)

IIT Delhi gets more funds for start-ups

Technology department sanctions Rs. 80 lakhs

To promote the spirit of entrepreneurship among young engineers and scientists, the Indian Institute of Technology, Delhi, has spruced up its funds for the Technology Business Incubation Unit.

The department of technology of the ministry of information and communication technology has sanctioned Rs. 80 lakhs over a two-year period to support seed funding of start-up ventures in information technology (IT) and IT enabled services.

The department of science and technology (DST) has also sanctioned Rs. 15 lakhs to support incubatee start-ups. Also, the Technology Business Incubation Unit has signed a memorandum of understanding (MoU) with the Indian arm of Beacon Ventureast Global Fund to support start-ups with either or both seed capital and venture capital.

The Technology Business Incubation Unit was put in place in June 2000 by IIT Delhi under the administration of Foundation for Innovation and Technology Transfer (FITT) and provides infrastructure on campus for a limited duration to facilitate research and development to convert nascent technological ideas into commercial entities.

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IIT-D Logs on to DBT's Biogrid

NEW DELHI: In an attempt to boost bioinformatics research in India, Indian Institute of Technology, Delhi (IIT-D) has decided to connect its supercomputing facility with the department of biotechnology (DBT). This will facilitate the integration of IIT-D's supercomputing facility with DBT's 60-odd research centres through Biogrid, a high-speed bandwidth based virtual private network.

The supercomputing facility, to be connected in 2-3 months time, will initially provide computational backbone to 11 centres on the Biogrid network for data and resource sharing. In the second and third phase, the remaining centres and DBT institutions are envisaged to be covered under the faster network.

"Research in biotechnology, which is highly knowledge and capital intensive, has generated a deluge of information in recent times. To make use of this information effectively, there is a need for high-speed bandwidth network," IIT Delhi director **Prof. R. S. Sirohi** said, adding, the supercomputing facility was set up to enhance Indian contributions to computational geno-mics, proteomics and drug design.

Prof Sirohi said, "It is not only involved in developing novel scientific methods and new software for genome analysis, protein structure prediction and active site-directed drug design, but also in establishing and maintaining a low-cost supercomputing environment for biocomputing and providing free and round-the-clock access to the scientific user community".

He added, "The facility is now being networked through Biogrid India so as to use the compute power and software at IIT Delhi by the Biogrid nodes remotely."

The supercomputing facility currently hosts a 70 processor (Ultra Sparc III 900 MHz) cluster over a Gigabit switch, two 16 Pentium 4 processor clusters and a 4 processor SGI Origin-200, besides several PCs. The aggregate compute power of the facility is over 150 Gflops and the data storage capacity is over 1.5 Terabytes.

"An ideal infrastructure scenario would be to put 10 teraflops of computing capacity on the Biogrid network with concurrent enhancement in communication speeds and storage capacities," **Prof. B. Jayaram**, coordinator for the supercomputing facility told eFE.

"It is desirable that such networks be built around active practitioners but essential that the student and scientific community be given free access round the clock. Excellence and leadership in bioinformatics is automatically ensured if this dream scenario could be realised." he added.

Giving details about the project, Prof. Jayaram said, DBT has set up a high-speed and high-bandwidth network in the form of virtual public network (VPN) named as Biogrid. Eleven nodes have been established in the first phase, which are actively pursuing bioinformatics activities besides, dissemination of biotechnology information to researchers in the country.

The nodes are interconnected through 2 Mbps dedicated leased circuit line at each location and 4 Mbps Internet bandwidth shared from the central server by all the nodes.

(Source: The Financial Express, April 15, 2004)

IITians Develop GIS Software

NEW DELHI: In what can help the country tackle environmental and social problems, a group of researchers at the Indian Institute of Technology, Delhi (IIT-D) has developed a software solution for natural resources planning and management.

The geographic information system (GIS) software is already being utilised by various government agencies for managing water resources, climate impact assessment and agricultural prediction using crop growth models, among others.

The software includes a secure and centralised database along with a portal for assimilating and analysing data collected from various sources.

The National Institute of Health and Family Welfare is also using this technology to set up a GIS-based database management system for HIV surveillance in the country. An annual sentinel surveillance information system for HIV is also being set up.

These researchers are a part of a incubatee company under Technology Business Incubation unit (TBIU) of IIT-Delhi. The company, called INRM Consultants Pvt. Ltd., was suppored by the Foundation for Innovation and Technology Transfer (FITT) of IIT-Delhi which provides seed money and infrastructure support to a start-up company.

"We are a start-up company incorporated by the faculty and alumni of IIT-Delhi and received infrastructure support in setting up a research and development (R&D) centre in IIT-Delhi." said **Prof. A. K. Gosain** of the department of civil engineering, IIT-D.

Prof. Gosain, who led the team of researchers in setting up the start-up company, said, "The purpose is to make available a cost-effective tool for general users with basic GIS functionalities like viewing, single-layer analysis, multi-layer analysis, external database connectivity, charting and reporting."

On these lines, INRM Consultants has developed a tailor-made GIS tool for Indian Coffee Board with similar functionalities. Prof. Gosain said the software has been developed on open source and is ready for dissemination.

"It is a fraction of the cost when compared to GIS software being made available by international companies, which can cost anywhere around Rs. 3 lakhs. It will be used for agricultural prediction using crop growth models in coffee cultivation." he said.

According to Prof. Gosain, "We have also developed a countrywide framework for GIS-based hydrological modelling of 12 river basins of the country.

(Source: The Financial Express, 20 August, 2004)

IIT's blood grouping card

The Centre for Biomedical Engineering (CBME) at IIT Delhi has developed a new blood grouping card that will save people the trouble of going to a lab to identify their blood group.

The card is the first step of a project given to IIT by the union government's department of science and technology. The objective of the project is to develop a similar card by which the ELISA test for HIV and other diseases can be conducted. The project will take some time to be completed.

The blood grouping card works on a simple principle. It has encircled spaces that have "stabilized" anti-serum on it. In case the blood on space "anti-A" remains intact, the blood grouping is not A. If it agglutines on space "anti-B", the blood group is B. If it remains intact on both spaces, the blood group is O and if agglutinates on both, the group is AB. Similarly, the space "ant-D" denotes the Rhesus factor (+ve, or –ve).

"We will apply for a patent", says CBME's head of the department **Prof. Harpal Singh**. "The unique thing about this card is that it can be stored by people at room temperature and is especially useful for soldiers," he adds. The CBME is also developing a porous insulin delivery capsule that will be beneficial for diabetes patients. "In the case of an insulin injection , the insulin levels shoot up and the blood sugar falls dangerously low but in the case of the capsule, this won't happen because the insulin will be absorbed only gradually by the blood stream, points out Singh.

(Source: The Hindustan Times, July 10, 2004)

Top MNCs hunt for best IIT brains

Indian Institute of Technology (IIT) Delhi's campus placements this year have got a headstart, with prominent companies angling for the best brains. For several students recruited already, it has been a steal with healthy pay packages.The campus placement drive began in August for the current academic session for those in their final year and will continue till May next year.

"Unlike the depression three years ago, the placement scenario this year has been very good," IIT's training and placement professor in-charge **Kushal Sen** said. "The highest package offered so far is about Rs. 7.5 lakhs per annum, offered by both Mckenzie and Hindustan Lever. The highest package in terms of a dollar salary is US $50,000 offered by MNC Capital-1. The average salary package is about Rs. 4 lakhs per annum," Sen said.

Companies, whose representatives have visited the campus so far, include Infosys, IBM, Wipro and Oracle. Engineering companies like Larsen and Toubro, finance firms like Capital-1 and consultancy MNCs like Mckenzie have visited the campus in the past two months.

"Pay package and the brand name are two major factors for us," said Rajat Gupta, a final-year B.Tech (textile) student.

"I have got a good offer from Oracle," a beaming Gupta said. So far, about 250 final-year students have been recruited.

(Source: The Hindustan Times, October 2, 2004)

Institute Revises Recruitment Dates

From next year, campus recruitment at the IITs will begin from December, instead of August, so that the placement drive doesn't hamper the academic calendar. "All the IITs have decided that the campus recruitment from the next academic session onward will begin from December. This will be applicable for the batch which completes their course in 2006," IIT Delhi's training and placement professor in-charge Kushal Sen told the Hindustan Times. Currently, the placement drive begins in August for students in the final year of their study and goes on till May. "We found that the start of the campus recruitment as early as August disturbs the teaching and learning process", Sen said, adding that till a few years ago, the M.Tech programmes at IIT were of one-and-a-half years' duration. "Therefore, it was felt earlier that since these students completed their course in December, the campus recruitment had to begin from August itself," he said. "However, the M.Tech programme now is of two years and they also complete their course in summer along with other students. So now, the campus recruitment can begin from December," Sen said. Students and faculty feel that the current placement time period stretches for nine months (August to May), which is rather long.

(Source: The Hindustan Times, October 2, 2004)

IIT, Singapore? Not Just Yet

NEW DELHI: An IIT in Singapore? May be not so fast. Despite countries like Singapore and Mauritius being interested in setting up campuses of the Indian Institute of Technology, our premier engineering institutes are shy of taking on the challenge. The reason — fear of brand dilution and possible competition from world-class institutes on home turf. Instead, the IITs and even the government would like to adopt a cautious approach and set up a collaboration with an existing institute in Singapore at the post-graduate level. This will help protect what has become IIT's trademark: an undergraduate programme of global standing.

As far as Singapore is concerned, sources say that the experience of a MIT campus has not been a happy one. The primary reason for this seems to be high charges.

For India, especially for the IITs, this seems to be a golden opportunity. India's premier engineering schools could well provide quality education at affordable rates, especially the acclaimed undergraduate programme. However, this would open the IITs to challenges that come with trading in education services. For starters, India would have to be opened up for foreign engineering institutions. This could mean competition from institutes of similar standing, say, the MIT. This raises fears of poaching of faculty and loss of students, leading to brand dilution. The fact remains that IITs have been cost-effective in a protected environment. A situation that would change with the General Agreement on Trade in Services (GATS) kicking in next year.

Experts are of the opinion that if the academic strength of the IITs is to be transformed into economic value, setting up international campuses is essential. The Americans have been at the forefront of open

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AWARDS/HONOURS/PAPER PRESENTATION/OTHERS

Awards

Prof. S. K. Dube, Director IIT Kharagpur and Faculty of Centre for Atmospheric Sciences, IIT Delhi have been awarded two prestigious Gold Medals: *Dr. K. N. Behl Memorial Gold Medal 2003* and *Prof. Norman H.Dill Gold Medal* to be presented in a Seminar entitled " New Frontiers in Marine Bioscience Research" jointly organized by the National Institute of Ocean Technology and the Society of Biosciences.

Prof. M. Khare of the Department of Civil Engineering has been awarded *Fellow of Wessex Institute of Great Britain*.

FITT Awards for Best Industry Relevant Ph.D. and M.Tech./ M.S. (R) Projects

With effect from the academic session of 2002-03, Foundation for Innovation and Technology Transfer (FITT) has instituted two awards, one each for Ph.D. and M.Tech./M.S. (R) projects adjudged as the best Industry Relevant Projects. The award carries an amount of Rs. 60,000/- for Ph.D. & Rs. 40,000/- for M.Tech/M.S. (R) Projects. The award money are shared 50:50 between the concerned faculty supervisor (s) and student (s) for both Ph.D. and M.Tech./ M.S. (Research) work. Accordingly, the under mentioned students were selected for the 2003-04 FITT Awards as follows:

Mr. Prabhakar Bhatt Ph.D., Research Scholar in the Department of Textile Technology. Project titled : *"A study on the role of yarn properties in double jersey loops"*. The Award amount is Rs. 30,000/-

Mr. Aradhye Charudatta Chandrakant Student of M.Des. Programme in the Instrument Design and Development Centre. Project titled: *" Design of a Surgical toolkit for maxillo facial bone plate System"*. The Award amount is Rs. 20,000/-.

Further, proportionate share of award money payable to the Faculty Supervisor (s) mentioned below are indicated against their names:

1. **Prof. P.K. Banerjee**, Department of Textile Technology, IIT Delhi The Award amount is Rs. 15,000/-

Prof. R. Chattopadhyay, Department of Textile Technology, IIT Delhi. The Award amount is Rs.15,000/-

2. **Shri Lalit Das** , Instrument Design & Development Centre (IDDC) of Indian Institute of Technology Delhi. The Award amount is Rs.10,000/-

Dr. K.Balasubramanian, Director, Non-Ferrous Materials Technology Development Centre (NFTDC), Hyderabad. The Award amount is Rs. 10,000/-

The above awards were conferred on the students concerned at the IIT Delhi Convocation held on August 14, 2004.

Highlights of the IITD Projects Awarded by FITT

1) A study on the role of yarn properties in double jersey loops- A Project by **Mr. Prabhakar Bhatt, Ph.D.**, Department of Textile Technology.

The study was designed to investigate the role of flexural, tensile and torsional rigidities as also the thickness of cotton hosiery yarns in the knitting process and in the dimensions of relaxed loop. Accordingly a TORSIOMETER was developed to a satisfactory level of performance and torsional properties of commercial cotton hosiery yarns were measured and characterized by a parameter that associates best with relevant fibre and yarn variables. Subsequently samples of rib, half cardigan & interlock structures were knitted from 16 different types of yarns and the respective knitting cam forces recorded on line. Five different types of loop dimensions were then measured of each stabilized sample. The resultant experimental data were analyzed for establishing the role of yarn properties on cam force and loop dimensions by employing General Linear Model. It was found that the mean torsional rigidity in twisting and detesting exhibits the strongest correlation of 0.98 with fibre and yarn properties. It was also observed that yarns of higher thickness, relative tensile rigidity, torsional rigidity and flexural rigidity lead to higher cam force. Incidentally the effect of the torsional rigidity is the strongest. The yarn torsional rigidity also affects loop dimensions strongly followed by flexural rigidity and relative (tensile) rigidity. However, in this regard, the yarn thickness is most important.

This study thus establishes the importance of yarn rigidities – the mean torsional rigidity being the most important of the three – and hence the necessity to measure and standardize them for hosiery yarns. It is expected that by measuring the flexural and torsional rigidity of yarns and standardizing them the knitters and also some woven fabric manufacturers would considerably benefited as it would be easier to produce dimensionally stable goods from natural fibres, which is still a major concern in Industry. The patented TORSIOMETER should become a standard laboratory instrument.

2) Design of a Surgical toolkit for maxillo facial bone plate System - A project by **Mr. Aradhye Charudatta Chandrakant,** student of M.Des. Programme in the Instrument Design and Development Centre.

The Project sponsored by NFTDC, Hyderabad was to design different tools and a sterilization kit required for maxillo facial surgery. The main aim was to give a complete tool kit to assist the Surgeons in maxillo facial surgeries. Tools included holding piers, bone plate bending pliers, cutting pliers, forceps and a sterilization kit for bone plates and bone screws. There was a team of surgeons and material engineers to guide at different phases of the project. This project can be defined as an user centered design project. The author studied the different activities involved in the surgery, hand movements by surgeons, biochemical aspects, safety aspects etc.

FOCUS ON A DISTINGUISHED FACULTY OF IIT DELHI

In this issue of FITT-FORUM, we are covering the Research & Development achievements of Prof. P. K. Banerjee, one of the distinguished faculties of IIT Delhi.

Prof. P.K. Banerjee

Dr.-Ing. Prabir Kumar Banerjee, who joined the IITD faculty in 1980, holds currently the position of Professor (since 1991) in the Department of Textile Technology. Different techniques of fabric manufacture and technical applications of the resultant products has been the focus of his R&D activities.

His academic interests have been moulded by the five years of shop floor experience that he acquired while working in theTextile Mills of Ahmedabad, Bombay, Surat and Delhi, just after graduating from the Serampore Textile College of West Bengal in 1966. The exposure to real life problems and the realization of the need to measure up to the technical issues motivated him to postgraduate studies, initially at IIT Delhi and subsequently in Germany. Upon rejoining the IIT Delhi as member of the faculty he became involved in the development of Fabric Manufacturing Laboratory and was instrumental in developing new courses in keeping with the needs of the changing profile of the Indian Textile Industry. Taking cognizance of the backwardness of the Indian Fabric Manufacturing Industry, caused to a large extent by the inadequate technical manpower, he became actively involved with some Textile colleges and Textile Research Institutes for guiding the growth of this discipline in India. His concern for the Indian Textile industry was not restricted to improvement of the fabric manufacturing techniques alone but encompassed the usage of Indian raw materials and development of new products from these raw materials. The abundance of natural fibres such as Jute and Coir in India and the need to develop value added products from them led him into the field of technical textiles.

In a specific branch of technical textiles, namely the Geotextiles, he has been closely associated with the faculties of the Civil Engineering Department of this Institute over the past two decades. This has resulted in three completed and one ongoing Doctoral research work as also one International and a number of national seminars and workshops all over India. This joint activity over such a long period has contributed not a little to the ever expanding infrastructural application of Geosynthetics in India as also in popularizing academic activities in this field in Indian research and teaching institutions. Indeed this close group activity of civil, textile and polymer engineers in a leading academic institute in the field of Geosynthetics is quite rare even at the International plane. The Textile Commissioner's office of the Government of India has informally recognized the excellence of this group in the Indian context. Currently plans are afoot to set up a Geosynthetics Research Centre in India, which would guide the development of indigenous Geosynthetics, drawing up realistic standards and specifications as also vetting designs and materials for diverse applications. This exercise is aimed at guiding the Indian Textile and Polymer Industry to claim a share of the global Geosynthetics market.

Besides being extensively involved with Geosynthetics, Prof. Banerjee has also worked in the field of Filtration and Superabsorbents. He has also been active in developing processes and products from Jute and Coir fibres, two renewable, biodegradable and abundantly available raw materials in India. Concerned at the steady decline of the Jute sector, which forms an important component of the economy in the eastern and northeastern states, he joined, on lien from IIT Delhi, the Indian Jute Industries Research Association (IJIRA) as its Director and spent a year in charting out strategies for revitalizing this sector. His initiatives during this period has resulted in the setting up of a North-East Regional Research Center of IJIRA at Guwahati, the thrust of which would be to guide the cultivation, extraction and processing of Jute and Ramie fibres in this region so that the people of North-East can reap the benefit of these natural resources instead of sending the unprocessed raw materials to other states. During this period he also spent considerable time in the villages where Jute fibre is cultivated and extracted. Drawing on this experience he worked out a strategy for a more effective process that would benefit the farmers. He also developed blueprints for modernization of Jute Mills that would be churning out more value added products through effective technological interventions.

The other major interest of Prof. Banerjee concerns the development of the Indian Cotton Knit goods Industry. Having been for far too long restricted to the small-scale sector, the technology and the technical manpower of this industry were far too inadequate for modern times. Since joining the IIT Delhi as a faculty member, he has contributed significantly to the growth of this sector. This process was started with the development of a laboratory, which formed the platform for conducting new course work for the students of IIT, carrying out research work with Ph.D. students – resulting in four completed doctoral theses to date in this field alone -, executing consultancy works for the industry as also training manpower of the Industry and other academic institutes through modular programme and QIP programme. Students of other Institutes have also freely utilized this laboratory in the past. This subject, which used to be hardly taught in Indian Textile Colleges in the early 80's, forms now-a-days a common, and in some cases, even a major component of the syllabus. The R&D work carried out in this discipline by Prof. Banerjee during this period has resulted in a body of knowledge that is ready to be transferred to industry for addressing some long-standing issues Prof. Banerjee has developed a number of products and equipments in association with faculty members of the IIT Delhi, the most notable of which are:

1. The TORSIOMETER for measuring the torsional rigidity of spun yarns
2. The Superabsorbent COIRSORB
3. The BRECODRAIN – a Prefabricated Vertical Drain
4. The machine for manufacture of BRECODRAIN
5. The non-leaking low shear and high shear Geosynthetic Clay Liners
6. A Pre-Seeded Erosion Control Blanket
7. Knitted filter for Baghouse

He is currently involved in the development of an indigenous Asphalt Overlay Fabric that would enhance the life of paved roads in subtropical climate. He may be contacted on the following address:

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MoU Signed Between FITT and Escorts Corporate Research Development Centre, Faridabad

Foundation for Innovation and Technology Transfer (FITT), New Delhi, an industry interface of Indian Institute of Technology (IIT), Delhi, and Escorts Corporate Research Development Centre, Faridabad have entered into a Memorandum of Agreement (MoA) for conducting performance evaluation and emission studies of tractor engines using Diesel and Biodiesel as Fuel. The MoA was signed by **Dr. A. K. Sengupta**, Managing Director, FITT and **Mr. M.C. Sarkar**, Head, Escorts R&D Centre on 8th April 2004. The studies are being conducted in pursuance to the project undertaken by the Engine and Unconventional Fuel Laboratory (EUFL) of IIT, New Delhi, on behalf of Ministry of Non-Conventional Energy Sources, Govt. of India. **Dr. L.M. Das** in Centre for Energy Studies and **Dr. S.N. Naik** in Centre for Rural Technology Development are the Principle Investigators from IIT, Delhi.

(Right) Dr. A. K. Sengupta, M. D., FITT and (Left) Mr. M.C.Sarkar, Head, Escorts R&D Centre, exchanging the documents

The studies envisage evaluation of Bio-diesel blends produced by EUFL using the tractor engines produced by Escorts. Biodiesel will be produced from Karanja and Jatropha seeds. Bio-diesel blended with petroleum–based diesel in different proportion will be tested for engine performance. After carrying out exhaust emission and engine durability studies on engine dynamometer test bench at Escorts (R&D), field trials will be taken-up jointly by IIT and Escorts (R&D) using the engine supplied by Escorts. Durability tests for 300 hours will be conducted for ascertaining the satisfactory performance.

While Escorts (R&D) generates engine performance and emission data, EUFL will be generating Physico-chemical data for the fuel. These data will be jointly examined by both Escorts and EUFL for determining the optimum blending proportion and also to carry out any modification in the engine or fuel injection system for efficient engine performance.

A Joint Project Team and a Project Review Team with members from Escorts and IIT / EUFL will be set up for execution and monitoring of the Project.

List of IPR Applications Approved for Filing by IITD-IPR-SC during March-August, 2004

S. No.	*Title of the Invention*	*Principal Inventor/ Deptt./Centre*
1.	Inherently Gain Flattened Dispersion compensating Raman Fiber Amplifier	Dr. K. Thyagarajan DPhy.
2.	An Analog-to-Digital Converter with Low Hardware Complexity and Facility for Programmable Code	Dr. Jayadeva DEE
3.	Phase Transfer Catalysis in Polyaphrons for Soap Manufacture	Dr.A.N. Bhaskarwar DCh.E
4.	Bioactive ABO Blood Grouping Card	Dr. Harpal Singh CBME

It is to be noted that all IPR related activities in IIT Delhi is coordinated by FITT.

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National Technology Day Celebration

The National Technology Day was celebrated at IIT Delhi on Tuesday, the 11th May 2004 with a well attended seminar meeting in the Senate Room of the Institute. The function was organized under the aegis of FITT. **Prof. R. S. Sirohi**, Director, IIT Delhi presided over the function.

Three distinguished speakers amongst IIT Delhi faculty members made presentations in the areas of Medical textiles: vision & innovation, Biomedical Engineering in clinical medicines, Technology for Energy & Environment. IIT Delhi faculty members who made the presentations were **Prof. Bhubanesh Gupta** of the Department of Textile Technology; **Prof. K.D.P. Nigam** of the Chemical Engineering Department and **Prof. Sneh Anand** of the Centre for Biomedical Engineering. Besides these three distinguished speakers, **Shri Dipender Sekhon**, CEO, KritKal Solutions (P) Ltd., a TBIU Start up company of IIT Delhi, made a presentation on Computer Vision & Embedded Systems.

DEPARTMENT OF BIOCHEMICAL ENGINEERING & BIOTECHNOLOGY

The Department

The Department of Biochemical Engineering & Biotechnology at IIT Delhi has a unique place in the development of Biochemical Engineering discipline in India. The biochemical engineering activities at the Institute began in 1968. An Indo-UK collaboration generously supported the M.Tech. and Ph.D. programmes that were initiated. The Institute took an early note of the significant role that was to be played by biochemical engineers and biotechnologists in future industrial development of biotechnology based processes and an independent Biochemical Engineering Research Centre (BERC) was created which offered M.Tech. and Ph.D. programmes in Biochemical Engineering and Biotechnology. Since 1989, it is a department of Institute offering UG / PG degrees and opportunities for research in biotechnology field.

Academic Programmes

At UG level, the department runs a 5-year Integrated Dual-Degree Programme in Biochemical Engineering and Biotechnology for students who have qualified JEE. A major project in the form of M.Tech. Dissertation is done by the students in various research areas pursued by the departmental faculty. The department also runs a 4-semester M.S. (Research) programme for students who have a B.Tech. degree in specified engineering discipline. Ph.D. and post-doctoral research opportunities are provided to students in the frontier areas of Biotechnology. Candidates graduating from these programmes constitute valuable human resources for chemical and biochemical industry, for teaching and research in academic institutions and biotechnology industry, and for positions of management of biotechnology within the country.

Research Areas

The research areas being pursued by the department reflect the expertise of the faculty which ranges from molecular biology through to bioprocess engineering. Many of the research areas are multi-disciplinary with input of inter-related expertise. The department offers the required support to the Biotech industries and research organizations, both in India and abroad by way of undertaking consultancy projects from industries as well as long-term sponsored research projects. Current areas of research in the department can be broadly classified as follows :

Microbial Fermentations

The microbial fermentations are studied for production of useful products such as lactic acid, 2-3 propanediol, sorbitol, antibiotics, growth factors, industrially useful enzymes such as cellulase, xylanase, b-glucosidase, gums, biopesticides.

On-line CO_2/O_2 analyzer for microbial fermentations

Bio-separation and Downstream Processing

Considerable research is going on in the area of development of novel separation strategies for commercially important products such as enzymes, therapeutics (streptokinase, urokinase).

Molecular Biology, Designed Vector Construction, Plasmid Biology

Some new T-7 based expression vectors have been developed and a patent for the same has been filed with the assistance of FITT. The basic studies on the mechanism of plasmid DNA replication are being carried out. The genes for several industrially useful enzymes (b-glucosidase, laccase) have been cloned and expressed in the common bacterium, *Escherichia coli* and studied in detail for various applications. Solvents stable proteases have been developed for possible use in the textile industry.

Analysis of recombinant bacteria for cloned laccase activity

Environmental Biotechnology

Aerobic and anaerobic processes have been developed for effective treatment of wastewater effluents generated from various industries.

Enzyme Engineering and Molecular Enzymology

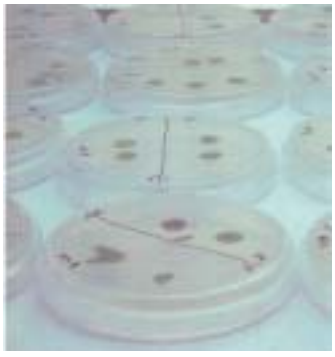
Industrially useful enzymes are being investigated for their properties useful in catalytic activities. Non-conventional methods for engineering of enzymes to lend stability under various process conditions are also being investigated.

Animal and Plant Cell Culture Technology

Chinese hamster ovarian cell lines have been modified suitably and are being studied for production of urokinase. Affinity based method for separation of urokinase to injectable level of purity has been developed. This activity is being pursued under a collaborative programme with Lund University, Sweden.

Plant cell lines of trees such as *Azadirecta indica*, *Podophyllum hexandrum* have been developed for production of secondary metabolites. Methods are being optimised for cultivation of these cell lines in a bioreactor.

Plant cell lines being cultivated in flasks



Hairy root cultures of Azadirector indica (neem)- leaf disc

Biopharmaceutical Laboratory has been set up recently with support from FITT. Specially designed bioreactors have been procured to facilitate cultivation of plant cell lines.

Bioenergetics

Investigations are being made as to how the processes of ATP generation, muscle contraction occur inside the living cell. Thermodynamic principles are being applied to have a clearer understanding of these phenomena. This research activity is being funded through Swaran Jayanti Award (DST) given to one of the faculty.

Protein Folding Pathways

The basic problem of protein folding in a recombinant cell is being investigated. Many of the smaller proteins in *Escherichia coli* are folded with the assistance of molecular chaperons. Application of this to understand how large proteins are folded correctly inside the cell is being studied. Sophisticated biophysical techniques such as CD polarimetry, spectrophotometry for protein structure determination and folding pathway elucidations are being used. **FITT has given a large grant to the department to procure the CD polarimeter to do in-depth research in this area.**

FITT supported Jasco CD Polarimeter for protein folding studies

Bioinformatics

The department has recently taken strong initiatives to carry out research in this emerging area of biotechnology. A separate Bioinformatics Laboratory is housed in the department which has the latest software to carry out investigations of sequence analysis, molecular modelling etc. Bioinformatics teaching is conducted in the form of small workshops, QIP/CEP sponsored programmes etc. The department also receives a large grant from Department of Biotechnology to maintain a Biotechnology Information Sub-system in its premises. Several M.Tech. projects have been successfully completed in this area. Collaborative research from other departments of the Institute as well as from neighbouring institutions such as International Centre for Genetic Engineering and Biotechnology, National Institute of Immunology, Institute of Genomics and Integrative Biology, is being taken up in this area.

Facilities

The department has infrastructure to support a wide range of research activities. Some of the major equipments of the department are:

--Bioreactors of different sizes (2 liters to 1000 liters volume) with one-line CO_2/O_2 analyser
--Analytical Instruments including centrifuges, electrophoresis (nucleic acids and proteins), Chromatography, HPLC, FPLC, spectrophotometers, Atomic Absorption Spectrometer, CD Polarimeter, Spectrofluorometer
--PCR machines, nucleic acid sequencing apparatus, gel documentation unit, gel dryer
--Culture growth chambers
--Culture storage facilities such as deep freezers and lyophilizer
--Radioactive laboratory & dark room
--Netfinity Server with 50 workstations
--ELISA reader

The facilities of the department are complemented by resources available in other departments of the institute, such as NMR, SEM and ASA. Being a department of IIT Delhi, it is in a unique position to tap the intellectual resources to carry out inter-disciplinary research such as Bioinformatics, Environmental Biotechnology.

Sponsored Projects and Consultancies

In the last 10 years, the department has handled sponsored projects worth Rs. 5.0 crore and consultancy projects to the tune of Rs. 1.5 crore. Recently handled sponsored projects by the departmental faculty are listed below :

--Development of the plant tissue culture facility for production of high value therapeutic drugs
--Adaptive hybrid neural networks for on-line control of L-methionine production
--Prebleaching of Kraft pulp using xylanase and ancillary enzymes
--Bioethanol from alternative feed stocks
--Investigation of ion translocation in chloroplast thylakoids and validation of Nath's torsional mechanism of energy transduction and APT synthesis

...Contd. on page 14

NaCoMM-2003
December 18-19, 2003

The 11th National Conference on Machines and Mechanisms (NaCoMM-2003) was held at IIT Delhi during December 18-19, 2003 was organized by the Department of Mechanical Engineering. This is a biennial event supported by the Association of Machines and Mechanisms (AMM), India, affiliated to the International Federation of the Theory of Machines and Mechanisms (IFToMM). The welcome address was given by **Prof. K.Gupta**, Chairman, followed by the address of **Prof. R. Sirohi**, patron of NaCoMM-2003, who stressed upon the importance of such conferences. In the inaugural address, the chief guest, **Dr. Surinder Kapur**, Chairman of Sona Group and others, emphasized the industry-institute interactions for enhanced technology innovations and developments for India so that it can take an edge over other countries.

The conference was well-attended by more than 150 people from seven different countries, namely, Canada, Japan, Netherlands, Sri Lanka,

Top Photo (From Left): On dias: Dr. S. K. Saha, Org. Sec. (NaCoMM-2003); Sitting: Prof. K. Gupta, Head, ME (IIT Delhi), Prof. R. Sirohi, Director (IIT Delhi); Dr. S. Kapur, Chairman (Sona Group), Dr. V.J. Sundaram, President (AMM), Prof. Amarnath, Vice-President (AMM), Prof. T. S. Mruthyunjaya (IISc)

Sweden, USA, India. During the two-day conference, an exhibition of CAD tools and simulation software by Autodesk, LMS, PTC, UGS-PLM, DPS Technologies, and hardware components by Strategi Automations, was also arranged for the benefits of the participants. There were one keynote and three memorial lectures by four renowned professors and researchers from Stanford University, USA, IIT Bombay, Quest India Ltd., and BHEL R&D, Hyderabad. The memorial lectures were in the memories of the faculty, i.e., **Prof. B. M. Belgaumkar** (IIT Kharagpur), **Prof. K. Lakshminarayana** (IIT Madras), and **Prof. S. Biswas** (IIT Delhi), who significantly contributed in the areas of Mechanisms and Machines. More than 150 papers were submitted, out of which 94 peer reviewed. The papers were published in a 800-page book by Allied Publishers, New Delhi, which was also made available in CDs.

For further information, please contact:
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DD-Robocon 2004

IIT Delhi students have participated for the 2nd time in the Doordarshan Robocon 2004 competition held in the Nirma University, Ahmedabad during July 26-28, 2004. Both the times, the IIT Delhi team got into the semifinals. This time the Robocon 2004 Team of IIT Delhi has defeated the Nirma Institute of Engineering who were champions for last two years.

National Level DD-Robocon is the biggest Robotics Competition in India and the champion represents India in the international competition to be held in September this year in Seoul. The youngest team comprising of second and first year students of IIT Delhi from different departments under the guidance of **Prof. S.K. Saha** enjoyed every moment of it. As one of the team members comments, "It was an amazing learning experience to interact with fourteen highly qualified Robocon teams who had applied every bit of their knowledge and experience to produce manual as well as fully automatic Game playing robots." The whole event was captured by DD cameramen and telecasted a week later. News about the event hit the screens of all news channels. The event ended with VESIT college, Mumbai, emerging as the winner and will go to South Korea. The experience has encouraged them students to form a Robotics Group under the Hobby Society of BRCA, IIT Delhi. The robots were demonstrated to the students of IIT Delhi on August 2, 2004 in SAC, and later to the Director, Deputy Directors, and other faculty members on the day of the Independence Day celebration in front of Himadri Hostel.

Ohmm, Problem!!!!

Yes, we got it now!!!!

Manual Robot

An Automatic Robot

For further information on IIT Delhi's participation in DD-Robocon, please contact:

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Third Certificate Course on Embedded Systems and Applications (August 18- November 25, 2004)

Based on the curriculum and courseware developed on Embedded Systems as an internal project, the first and second certificate courses on Embedded Systems and Applications were conducted during September 8 to November 21, 2003 and during January 14-April 20, 2004 respectively. The second course concluded with closing session on 20th of April, 2004 with distribution of certificates to those completing the course of two and half months.**The Third Certificate Course on Embedded Systems and Applications** was launched on August 18, 2004 and is currently underway. Based on the feedback received in the last course form participants and industry, some modification were carried out and second course is of the duration of three months and will have 220 contact hours including 20 hands on practical. There are fifty two participants enrolled in the third course, majority of them are with a graduate degree in Electronics and Telecommunication, Computer Science Engineering, Instrumentation and some with MCA degree. The course has 10 modules with the following broad contents:

Core Modules

--Introduction to Embedded Systems

--Designing Embedded Computing Platform

--Operating System for Embedded Systems

--Embedded System Architecture

--Programming Embedded Systems

--Network Based Embedded Applications

--Embedded System Development

Application Modules

--Embedded Control Applications

--Applications in Telecom

--Multimedia Applications

The special features in the previous course were seminars of the industry-experts and this will be also salient point of this course.

For more information, please visit our website www.fitt-iitd.org

Certificate Course in BioInformatics & Computational Biology

The Supercomputing facility for Bioinformatics & Computational Biology, IIT Delhi in association with NIIT Limited under the aegis of FITT, IIT Delhi has started a Certificate Programme in Bioinformatics & Computational Biology from June 07, 2004. The programme addresses requirements in both IT and Bioinformatics training. The IT modules are offered at NIIT and the Bioinformatics modules at the Supercomputing Facility, IIT Delhi.

The mission of the Supercomputing facility for Bioinformatics & Computational Biology (SCFBIO) at IIT Delhi is to promote Indian contributions to advances in genomics, proteomics and drug design, through research and training programmes and through indigenous software development. The facility currently hosts a 70 Ultra SparcIII 900 MHz processor cluster over a Gigabit switch, two 16 P4 processor cluster and a 4 processor SGI ORIGIN-200, besides several PCs. The aggregate compute power of the facility is over 150Gflops and the data storage capacity is over 1.5 Terabytes.

List of modules offered:

10 modules in Information Technology & 10 in Bioinformatics.

IT modules: Computer fundamentals, Unix(Linux), Programming (Fundamentals, Shell, Perl), OOPS using C++, Introduction to Core Java, DBMS, RDBMS & Data mining, HTML & XML, Parallel & Cluster Computing, Introduction to Graphics & Visualization & Artificial Intelligence.

Bioinformatics modules: Foundation Course in Modern Biology, Bioinformatics-1, Computational Biology-1, Introductory Biomathematics & Biostatistics, Bioinformatics-II, Biomolecular Modeling & Simulation, Genomics & Proteomics, In Silico Drug Design & System Biology.

For more details, please visit the website: www.fitt-iitd.org or contact
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An Intensive Short Course on Handling and Transportation of Flyash (Pneumatic and Dense Slurry Conveying) 11 – 13 October, 2004

Coal ash handling in the thermal power stations has attracted a great deal of attention during the recent years. Two factors have been responsible for this situation.. The first is the environmental concerns due to the polluting nature of this material and second is the enormous quantity of flyash produced in the power stations. Water and land scarcity has forced the plant management and the regulating agencies to push for utilization of flyash in various applications.

This Three-day course on the subject would be of specific interest to both designers and users of pipeline transportation of solid materials. The sessions cover various aspects of system design, component selection and the conveying capability of a large number of different materials. It is a practical course, with emphasis on design, operation, control and maintenance of systems, and features a number of case studies. The case studies will cover design of systems to convey flyash in both dilute and dense phase conveying. Due consideration will be given to recent developments and innovatory systems. Health and safety aspects of the conveying systems in plant conditions will also be considered.

In addition to the lectures, laboratory visits to the pneumatic conveying and slurry transportation facilities shall be arranged during the course. The course shall be held at IIT Delhi campus from 11th to 13th October 2004.

For the registration fees and other details please visit www.fitt-iitd.org or www.iitd.ernet.in or contact

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IIT Delhi celebrates World Copyright Day & World Intellectual Property Day

World Intellectual Property Organization (WIPO), which is one of the United Nations body, has declared 23rd April as the World Copyright Day and 26th April as the World Intellectual Property Day. Every year these days are celebrated all over the world. IIT Delhi also celebrated both these days this year.

On this occasion, IIT Delhi, organized a " National Workshop on Copyright Issues and IPR Education" during 23-26 April 2004.**Prof. R. S. Sirohi**, Director, IIT Delhi Chaired the activities on 23rd April 2004 in which IPR Attorneys viz. **Mrs. Pratibha Singh**, **Mr. Abhishek Malhotra** and **Ms. Jyoti Verma** and other government officials viz. **Mr. Rajiv Ranjan** & **Mr. T. C. James** addressed the participants. **Prof. K. L. Chopra**, Ex-Director, IIT Kharagpur chaired the proceedings on 26th April, 2004 in which **Mr. Pushpendra Rai**, Dy. Director, WIPO delivered a lecture on " Intellectual Property Strategy for Development in the Era of Globalization".

A large number of Faculty Members and Students very actively participated in the Workshop on both the days and made useful contributions. **Dr. Sudhir K. Jain** (Coordinator, IPR Cell) coordinated this Workshop which was sponsored by the Ministry of HRD.

Workshop on ESP Performance: Role of Fly Ash Resistivity

A Workshop on ESP(Electrostatic Precipitator) Performance: Role of Flyash Resistivity was jointly organized by Center for Energy Studies, IIT Delhi and Centre for Power Efficiency & Environmental Protection (CenPEEP), NTPC at India International Centre, New Delhi during September 23-24, 2004. Around 100 delegates from power utilities across the country and academic institutions participated in the workshop. It addressed the status and performance of ESP in India, role of fly ash resistivity measurements for collection efficiency improvement, modeling of ESP performance evaluation etc. The workshop also deliberated other strategies like flue gas conditioning, sodium dosing etc. to improve the ESP performance. Out of many processes, like flue gas conditioning, intermittent charges, ash conditioning, electrode design modifications etc., to improve the performance of ESPs, the modification of fly ash resistivity was identified the most effective process.

During technical sessions of the workshop lectures were delivered by the experts from National Thermal Power Corporation (NTPC), Bharat Heavy Electricals (BHEL), Central Pollution Control Board (CPCB) and Indian Institute of Technology (IIT), Delhi. During interactive session engineers/researchers from various power plants across the country shared their experiences/problems related with ESP design/operation experiences related with ash conditioning with sodium salt, flue gas conditioning with SO_3 and water fogging, ammonia conditioning were discussed for the improvement of the performance of ESP at some power plants.

The workshop delegates visited flyash resistivity facility at IIT Delhi and familiarized themselves with various related concepts.

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...Convocation at IITD 2004 *(Contd. from page 1)*

Prof. M. G. K. Menon, in his speech mentioned that the IITs have emerged as premier institutions and role models in the field of higher technical education. Each one of the students taking his degree today has the assurance that he or she has been provided the finest education in their chosen field in the country. It is a matter of great pride that this is something which is accepted the world over.

330 candidates received B.Tech degrees, M.Sc.(82), D.I.I.T.(13), 5-year Integrated M.Tech. in Maths & Computing (25), 5-year Dual Degree Programme (M.Tech. & B.Tech.) (79), M.Tech (598), M.Des.(14). M.S.(Research) (14), M.B.A.(78), Ph.D.(87).

...IIT, Singapore? Not Just Yet *(Contd. from page 6)*

ing up of markets for education services under GATS, which came into force in 1996. GATS provides for legal rights to trade in all services, except those taken care of entirely by the government. Education is one of the 12 services included in the list of activities binding member countries to allow market access and remove restrictions in the path.

Higher education is the fifth-largest service exported by the US. According to some estimates in 1996, US exports of education and training services reached a figure of $8.2 billion. While trade surplus in education amounted to $7 billion. While IIT would like access to other markets, quite naturally, it would prefer not to face competition. However, for the IITs, this could mean missing an opportunity.

(Source: The Economic Times, 19 August, 2004)

...Sponsored Projects and Consultancies: Department of Biochemical Engineering & Biotechnology *(Contd. from page 11)*

--Solving the fundamental : problem of protein misfolding and aggregation during over expression of proteins in *Escherichia coli* cells
--Study of secretory pathways for proteins in *Saccharomyces cerevisiae* through genomics
--A study on the alternative sources for production of alcohol
--Culture media and fermentor opiating conditions optimisation for growth of acenetobacter
--Development of potential membrane applications for water disinfection and alcohol fermentation

For any further enquiry, please contact :
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FITT MISSION

To be an effective interface with the industry to foster, promote and sustain commercialisation of Science & Technology in the Institute for mutual benefits.

FORTHCOMING SEMINARS/CONFERENCES/EVENTS IN IIT DELHI

Geosynthetics India 2004
October 27 - October 30, 2004

A Seminar-Workshop on Geotechnical Engineering Practice with Geosynthetics

GEOSYNTHETICS INDIA 2004 is being organized during October 27-30, 2004 by Indian Geotechnical Society (Delhi Chapter), IIT Delhi (Civil Engineering and Textile Technology Departments) and the Textile Association (Delhi Chapter) in order to create a close interaction amongst all those concerned with the Technology of Geosynthetics and their multitude of applications. The venue will be Radisson Hotel, New Delhi.

The topics dealing with GEOSYNTHETICS being covered during the Technical Sessions of the Seminar are: Geosynthetic Characterization, Reinforced Soil Retaining Structures, Reinforced Soil Slopes and landslide mitigation, Embankments on Soft Soils, Pavements, Liningsystems(canals,ponds,landfills), Drainage of soft soils and ground improvement, Coastal and waterway protection, Natural fibre geotextiles from Jute/coir and Product Development .

The emphasis will be on the practice with Geosynthetics. In each of the Technical Sessions there will be a Key Note presentation giving an overview of the design and construction methodologies. In addition there will be an Invited presentation to focus on wider issues. The presentations will be made by experts (both national and international) on the various topics. Subsequently there will be presentations by authors.

GEOSYNTHETICS INDIA 2004 invites all those interested in the field of GEOSYNTHETICS i.e. designers, manufacturers, specifiers, environmentalists, contractors, researchers, consultants, laboratories and suppliers to participate actively and add one more milestone in the furtherance of Geosynthetics in India.

For the registration fees and other details please visit
http://www.iitd.ernet.in/utilities/new/geosynthetics.html / or contact
Prof. P. K. Banerjee, Phone- 011-26591409,
E-mail: pkb@textile.iitd.ernet.in Or Prof.G.V. Rao,
Phone- 011-26591188 E-mail: gvrao@civil.iitd.ernet.in

National Conference on Biomechanics
November 19-21, 2004

The Eighth National Conference on Biomechanics is being organized by Centre for Biomedical Engineering, Indian Institute of Technology Delhi between 19-21 November, 2004 under the aegis of Indian Society of Biomechanics.

Biomechanics is an interdisciplinary science and emerged as an authenticated bridge between medical discipline and engineering. This conference will provide a unique platform for the exchange of recent advances in biomechanics and its applications to clinical problems.

The topics covered in the conference will be in the areas of: Orthopeadic and Implants Mechanics, Biofluids Mechanics, Cardiovascular Mechanics, Cellular Biomechanics, Tissue Engineering and Biomaterials, Sports Biomechanics, Physio-therapeutic Biomechanics, Modeling and Simulation in Biomechanics, Soft and Hard Tissue Biomechanics and Rehabilitation Engineering and Bioinstrumentation.

For the registration fees and other details, please visit
http://www.iitd.ernet.in/new/ncb2004/home.html / or contact
Dr. R. K. Saxena
Organising Secretary - NCB 2004
Centre for Biomedical Engineering
Indian Institute of Technology
New Delhi-110016, Phone: 91-11-26591150, Fax: 91-11-26582037
E-mail: rks@cbme.iitd.ernet.in , ncb2004@indiatimes.com

International Course on Transportation Planning and Safety, 09-15 December, 2004

The Transportation Research and Injury Prevention Programme (TRIPP) at the Indian Institute of Technology Delhi, the French National Institute for Transport and Safety Research (INRETS) France, and the International Research Council on the Biomechanics of Impacts (IRCOBI) are organizing a seven day International Course on Transportation Planning and Safety. The course will be held in New Delhi, India from 09-15 December 2004 and the TRIPP, IIT Delhi will be the host institution.

This seven day Course will bring together professionals working in the area of transportation planning and safety promotion to acquaint them with the state-of-the-art information in the field. The Course is especially designed for an interdisciplinary audience of law enforcers, police officers, traffic and road engineers, behavioral scientists, and mechanical engineers. The contents of the Course are especially focused to give a global perspective to the road safety and injury control problems.

The Course will have a limited number of participants who must be fluent in English. The participants will be selected on the basis of their involvement in transportation planning and road safety research, involvement in policy making and implementation of safety measures. An attempt will be made to have a balanced mix of engineers, law enforcers, social scientists and medical professionals.

For the registration fess and other details, please visit
http://www.iitd.ernet.in/ or contact
Mrs. Arati Walia, CONFER
Professional Conference Management Services
D-1, Kalindi Colony, New Delhi - 110065, India
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5 Fs of FITT

1. Friendliness ***2. Flexibility***
3. Freedom ***4. Focus***
5. Facilitation

FITT PROGRAMMES

HRD PROGRAMMES

Since March 2004 and till now, 12 customised HRD programmes were held under the aegis of FITT. A list of some HRD programmes completed during the past few months, ongoing and forthcoming courses is given below:

S.No	Title	Sponsors/Participation	Date & Venue	Co-ordinator & Deptt.
	HRD Programmes (Concluded)			
1.	Second Certificate Course on Embedded Systems and Applications	Participation based	9 January to 20 April, 2004 IITD	Prof. S. Chaudhury, EED Dr. Subrat Kar, EED
2.	Information Security	Participation based	23 February to 17 April, 2004 IITD	Ms. Akhila Sinha, CSC
3.	Short Term Course on Emerging Wireless Technologies	Participation based	12 April to 16 April, 2004 IITD	Dr. Ranjan Bose, EE
4.	Process of Manufacture and their Understanding and Practice	Applied Research International, New Delhi	One year (w.e.f 27-2-2004) IITD	Prof. R. Sagar, ME
5.	Electro Technical Officers of Berry Inter oceanic-training and advise program	Applied Research International, New Delhi	31 May to 31 August, 2004, IITD	Prof. R. Sagar, ME
6.	Landfills-Design, Construction & Operation	Mumbai Waste Management Ltd., Maharashtra	16-18 July, 2004, Mumbai	Prof. Manoj Dutta, CE
7.	Advise and Training on Algorithms & Data Structures	Cadence Design Systems (India) Pvt. Ltd., Noida	May 28-29 and June 4-5, 2004, Noida	Dr. Naveen Garg, CSE
	Ongoing Programmes			
1.	Joint Project on Technical Manpower Development by IIT Delhi and National Semiconductor, Bangalore	National Semiconductor, Bangalore	15 October 2003 to 15 October 2004 IITD & Natsem, Bangalore	Prof. G. S. Visweswaran, EED
2.	Third Certificate Course on Embedded Systems and Applications	Participation based	18 August to 25 November, 2004, IITD	Prof. S. Chaudhury, EED Dr. Subrat Kar, EED
3.	Certificate Program in Bioinformatics and Computational Biology	Participation based	Six months (w.e.f 7th June 2004), NIIT & IITD	Prof. B. Jayaram, Chemistry
	Forthcoming Programmes			
1.	Coal Ash Transportation at Thermal Power Stations	Participation based	11-13 October, 2004 IITD	Dr. S. N. Singh, AM Dr. V. K. Agarwal, ITMMEC
2.	Training for EPFO Officers on Unix, JAVA, Advanced Unix and Windows 2003	Employees Provident Fund Organisation, New Delhi	To be decided	Prof. B. P. Pal, Head, CSC

TECHNOLOGY DEVELOPMENT PROJECTS AT FITT

List of some major Technology Development Projects at FITT during the last few months

S. No.	Title	PI	Deptt.	Client
1.	Airport Traffic Circulation Improvement in Northern Region	Dr Geetam Tiwari	TRIPP	Airport Authority of India, IGIA, New Delhi
2.	Media and Process Optimization for Fermentation of Pseudomonas Fluorescence	Dr Vikram Sahai	DBEB	M/s. Biotech International Ltd., New Delhi
3.	Investigation and Development of a sensor actuator based smart yoke for RPS performance	Dr I N Kar	Elect. Engg.	Sona Koyo Steering Systems Ltd., Gurgaon
4.	Analysis & Design of Rack & Pinion Gears for Improved Steering Performance	Dr S K Saha	Mech. Engg.	Sona Koyo Steering Systems Ltd., Gurgaon
5.	Local FE Stress Analysis and know-how transfer of ASME Div 2 Reactors for Panipat Refinery Expansion Project	Dr Santosh Kapuria	App. Mech.	Indian Sugar and General Engg. Corpn., NOIDA

SPONSORED RESEARCH AND INDUSTRIAL CONSULTANCY, IRD UNIT

List of some Major Sponsored Research Projects Undertaken by IRD Unit, IIT Delhi during the period 01-Apr-2004 to 31-Aug-2004

S. No.	*Project Title*	*Sponsor Name*	*P.I. Name*
1	Development of Semiactively controlled structures and devices for Seismic Protection using Smart Materials (RP01677)	Department of Science & Technology (DST)	T.K. Datta, Civil Engineering
2	Design and Development of EDFA Module R&D (RP01678)	Department of Information Technology	K. Thyagarajan Deptt. of Physics
3	Synthesized Spatio-temporal Optical Coherence for 3D Profilometry and Tomography (RP01686)	Department of Science & Technology (DST)	Dalip Singh Mehta IDDC
4	Design and Development of Technological Interface to Rehabilitate Spinal Injury Patients (RP01663)	Ministry of Social Justice & Empowerment	Jayashree Santosh CSC
5	Development of bioreactors for cultivation of hairy roots of Azadiracta indica (neem) (RP01666)	Department of Biotechnology, Ministry of Sc.& Tech.	A.K. Srivastava Bio-Chemical Engg. & Bio-tech.
6	Digital Image Processing Based Instruments for Evaluation of Textile Materials (RP01674)	Department of Science & Technology (DST)	B.K. BeheraTextile Tech.
7	E-Video: Video Information Processing with Enhanced Functionality (RP01683)	Department of Science & Technology (DST)	Santanu Chaudhury Electrical Engineering
8	Add-on Facilities for Development of Trickle Bed Reactor Technology: Part-1: Large ScaleHydrodynamic Studies for Distribution and Re-distribution/quench system(RP01662)	Centre for High Technology (under Min. of Petroleum)	K.D.P. Nigam Chemical Engineering
9	Sensor Networks with Applications to Environment Monitoring (RP01687)	Microsoft Research, Microsoft India (R&D) Pvt. Ltd.	B.N.Jain Computer Sc. & Engg.
10	Development of Orientation and Frequency Selectivity in Visual Cortex (RP01691)	Department of Science & Technology (DST)	Basabi Bhaumik Electrical Engineering
11	Development of an Instrument for Non-Destructive Assessment of Blend Proportion in Textile Fabrics (RP01672)	Department of Science & Technology (DST)	V.K. Kothari Textile Technology

List of some Major Consultancy Jobs Undertaken by IRD Unit, IIT Delhi during the period 01-Apr-2004 to 31-Aug-2004

1	Development of Geometric Modeling and Optimization Algorithms for Manifold Design (CW07022)	Virtual Engineering Services (P) Ltd.	P.V.Madhusudhan Rao Mechanical Engg.
2	Vetting and Certification of Dig & Restore of Roads (CW0686)	Reliance Communications Infrastructure Ltd.	S.N.Sinha Civil Engineering
3	Modelling and Simulation of Hermetic Compressors Phase-I (CW06924)	LG Electronics	R.S.Agarwal Mechanical Engineering
4	High Density Cell Fermentation & Stability Studies on Biofertilizers-Phase-2(CWE06904)	International Panacea Limited	V.S.Bisaria Biochem.Engg. & Bio-tech.
5	Groundwater Modelling for Pondicherry Region (CW07042)	Public Works Deptt. Pondicherry	A.K.Keshari Civil Engineering
6	Bio Assay Test and Analysis of Effluent & Air Emission (CW07052)	Batra Hospital & Medical Research Centre	B.K.Guha Chemical Engineering
7	Designing an Incentive/Disincentive System for Monitoring the performance of Fertilizer Companies (CW07047)	Ministry of Chemicals & Fertilizers	Sushil Management Studies
8	Model Structure for the National Engineers Registration and Licensing Board (CW06957)	All India Council for Technical Education	C.V. Ramakrishnan Applied Mechanics
9	Sun Asia Pacific Science & Technology Facility-Cluster and Grid Computing Research and Infrastructure Setup (CW07074)	Sun Microsystems Pvt.Ltd., Singapore	Dheeraj Bhardwaj Computer Sc. & Engg.
10	Adequacy Report for Hospital & other Waste Management (CW07051)	Sir Ganga Ram Hospital	B.K.Guha Chemical Engineering

FITT ACTIVITIES

National Geographic- IITD Tie-up for Innovation Contest: A National Search for the Innovator of the Year and the Young Innovator of the Year

National Geographic Channel in alliance with IIT Delhi

National Geographic Channel and IIT Delhi entered into a path breaking alliance for a national hunt for THE INNOVATOR OF THE YEAR and THE YOUNG INNOVATOR OF THE YEAR. The aim was to identify and recognize outstanding Innovators and concepts that have the potential to improve the way of life of Indians and encourage, enhance and cultivate the spirit of enterprise. The winner of THE INNOVATOR OF THE YEAR will receive an award of Rs. 10 lakhs and the winner of THE YOUNG INNOVATOR OF THE YEAR will receive an award of Rs. 2 lakhs, which will be held in a trust fund until the child turn 18.

The Campaign was inspired by one of National Geographic Channel's biggest programming initiatives for 2004-the series Nokia Innovation, which airs on the channel from October 3rd , *every Sunday at 10 p.m. Each of the eight episodes will go beyond the "wow" of technology featuring the people who are most affected by these advances as well as the heavy drama and pressurized politics that go on behind the scenes.*

The Innovator of The Year and The Young Innovator of The Year contests were open to innovators from any area of science and technology and entries divided mainly into 11 categories which are: energy management and conservation, environmental sciences, population and disease control, infrastructure and communication, software technologies, transportation, agriculture, urban living and rural infrastructure, entertainment and recreation, information technology and life sciences.

The contests were organized by the National Geographic Channel, and the tie-up with the IIT Delhi was with regard to technical evaluation of entries in selecting the top 10 finalists, who will present their innovation to a national level jury in a Symposium to be held in November 2004.

For detailed information on the contest and for entry form, visit the website: www.nationalgeographic.co.in/iit

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...**IIT Delhi gets more funds for start-ups** *(Contd. from page 4)*

"Nearly 700 projects are completed every year of which 5-10 potentially commercialisable ideas are identified which are financed by Foundation for Innovation and Technology Transfer or from proposed Dedicated Incubation Fund". **Dr. A. K. Sengupta**, managing director, Foundation for Innovation and Technology Transfer said.

As of now, the programme is opened to new entrepreneurs including faculty, students, alumni and scientists, start-ups and corporate research units.

"The Foundation for Innovation and Technology Transfer provides support services like seed funding which is about Rs. 15 lakhs. Infrastructure support in terms of labs and materials and fellowship programmes like 'Entrepreneur in Residence Fellowship' are also provided to aspiring entrepreneurs. The new entities pay nearly Rs. 1 lakh for registering." Dr. Sengupta said.

At present, there are four resident incubatee units including two faculty-student led companies.

Krtikal Solutions was started in September 2002 and works on embedded systems, ad hoc networks and computer vision.

VirtualWire Technologies was started in July 2003 which focuses on wireless applications, DSP and cryptography. SofBlue India is working on developing blue-tooth enabled energy meters. Besides, there are three more start-ups which will soon become effective.

(Source: Business Standard, 12 August,2004)

Letters to the Editor

Dear Sir,

It's so nice to read your magazine, Previous days I had gone through your magazine at cabinet minister's office. Really it's so intellectual type of magazine that you are publishing. First of all I would like to congratulate you on successful publishing of your magazine.

We have an organization called Global Need Foundation is an apex body of Indian Engineers, Managers, Parliamentarians, Technocrats, Scientists and Leaders of the Corporate World. G-NEED have developed hi-tech consultancy studies in Indian infrastructure sector like Oil & Gas, Steel, Power, IT, Telecom, Transport, Urban and Rural Industries and other related core sector.

So magazine published by your publication are so useful for us as it consists of various topics, articles related to latest information having it's own intensive values. Many consultant and visitors arrived at our office and they want to acquire knowledge of different emerging areas and field related to various information. So it can be beneficial for each other in coming future.

So it's our humble request to you that please send your Newsletter – FITT FORUM, regularly to us.

With Best Regards

Dr. S.K.Singh
(Director General)
GLOBAL NEED FOUNDATION
Loni Road, Shahdara, Delhi-110 094

M.DES DESIGN DEGREE SHOW 2004

The M.Des design show was held in IIT Delhi from July 13, 2004 to July 20, 2004. This has been the 10th Year of M.Des programme of IIT Delhi. The objective of this program is to create a design awareness in the industry and professional competence in the field of Industrial design. The final thesis projects is the culmination of all skills and knowledge the student has honed during the term of the course, guided by the able and experienced faculty members of IIT Delhi. This year work has the support of Samsung India, Maruti Suzuki, Timex, Godrej Boyce, Hero global Design and Eicher.

The Design Degree Show is an integral part of the M.Des. Industrial Design Curriculum. Its purpose is two fold:

1.To provide an opportunity to the industry to come, see, and probe the industrial design manpower being produced by the market challenges of tomorrow.

2.To provide a forum to the designers to interact with the general public who in the end are the final judges of design appropriateness.

Some of the project designs which were displayed are as follows:

Low cost E-Bikes for ladies; *Rural basic utility vehicle*; *Design of a microwave oven*; *Design of Motor bike for women*; *Surgical tool kit for maxilofacial surgery*; *Concept-NEV neighbourhood electric vehicle*; *Patrolling motorcycle for city police*; *Project on car interior design*; *Design and development of a portable washing machine*; *Design of a modular air-conditioner double decker chair car for railways*; *Personal campus vehicle*; *Design of a pleasure yacht for cruising*; *Animal rescue and health care truck*; *C Venz An electric motor driven vending vehicle designed for vending coke cans*.

Chameleon Human transporter- need for speed and passion

Smart Pot- a liquid food processor

RBUV- a rural utility vehicle

Ellie- a ladies motorbike

Oracle-a Desktop Computer: A computer which suits the workspace and user friendly

Concept-NEV: A Neighborhood Electric Vehicle

Car Interior for a distinct life style group

C-Venz: a Vending Vehicle- innovating the process of vending coke cans

E-Vega: E-Bike for Ladies

Plato: A low cost solution for platform ticket vending for the Indian Railways

Animal Rescue and Healthcare Pickup Truck

For the details please contact:
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IITians Develop Tech For Natural Sunscreens

New Delhi: At a time when the world is moving towards safer natural personal care products, an indigenous technology has been developed by Indian researchers for sunscreen creams based on natural products with anti-ageing properties. These sunscreen actives also offer superior protection from harmful ultra violet (UV) radiations, compared to the commercially used sunscreens in the market, claims **Prof. H. M. Chawla,** a member of the IIT-Delhi faculty who spearheaded the research work.

Prof. Chawla has also been instrumental is setting up **Sanmotech** (Synthesis and Natural Molecular Technologies), a technology start-up from IIT-Delhi, credited for the research work. Sanmotech researchers have identified and developed a chemical molecule in one of the most intensely researched field of chemical sciences, for development of innovative, marketable specialty products/processes. Besides, sunscreen actives for dermal applications, this molecule will find applications in molecular diagnostics, adhesive sealants for cell phones and other microelectronic devices, sensor materials, to name a few.

Sanmotech has applied for a worldwide patent for its discovery. It is now in advanced stage of discussions with a US company and an advanced materials company from Singapore for fine-tuning its R&D work for commercial applicability.

Explaining the R&D work, Prof. Chawla said, the work involved identification of the molecule called C40309, its synthesis and efficacy testing in laboratory as well as real-time conditions, as well as its formulation. "We are one of the few technology start-ups operating in chemical sciences. The initial thrust has been to develop highly effective sunscreen actives for dermal and other applications."

"The choice of sunscreen as the first target is mainly dependent up on scientific expertise/acumen and commercial feasibility." Prof. Chawla said. The organic sunscreen market alone is approximately Rs. 1,000/-crore and is growing at the rate of 6-8 per cent especially in Asia. Several leading global players like Siba Specialty, Roche, BASF, Bayer, Hindustan Lever Ltd., among others, are aiming at formulations based on sunscreen actives. According to Prof. Chawla, the methodology employed unique ultra violet (UV) absorption parameters of some metacyclophane (MMC) derivatives in seeking synergistic protection from harmful UV components of solar radiation as against currently used UV protectants in presently available sunscreens.

MMCs are relatively new molecular entities discovered around 1982. These molecules have now become one of the most researched and patented organic chemicals in recent years.
"The typical synthetic UV absorbers have limitations in performance due to limited spectrum of activity, skin penetration and allergic responses and long term usage issues on product safety. Our USP is to bring in a combination of wide spectrum UV-absorption-low permeability and better performance along with anti-ageing properties delivered through naturally occuring chemicals which are inherently safer than synthetic analogues." Prof. Chawla said.

According to Prof. Chawla, "By utilising our earlier work on chemistry of natural products, we feel better disposed towards providing the first versions of sunscreens with slow releasing anti-ageing attributes in the world. We see in our favour a growing consumer trend in preference for safer natural personal products and an increasing demand for multi-tasking sunscreen actives".

Sanmotech is now geared up for technology transfer and further joint development to take its novel technology to market place.

(Extracted from The Financial Express, 20 September, 2004)

Attention!

For any information regarding courses, seminars, conferences, symposia, workshops or latest developments at IIT Delhi and FITT, please keep in touch with the websites: **http://www.fitt-iitd.org** and **http://www.iitd.ernet.in**

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